

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

2. (Cancelled)

3. (Cancelled)

4. (Previously Amended) A semiconductor photo-detector, comprising:

an intrinsic or a first conduction type semiconductor layer, a photo-absorption layer comprising a superlattice semiconductor layer or a multiple quantum well semiconductor layer, and a schottky electrode are disposed on a substrate having a top surface and an end surface meeting at an edge;

said photo-absorption layer being spaced from said edge of said substrate adjoining said end surface;

a semiconductor multilayer structure of large schottky-barrier height having a schottky barrier higher in schottky barrier height than a schottky barrier between said photo-absorption layer and said schottky electrode is formed between said photo-absorption layer and said schottky electrode; and

a light incident facet on said end surface and forming an acute angle with said top surface, wherein incident light is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer.

5. (Original) The semiconductor photo-detector as claimed in claim 4, wherein said semiconductor layer of large schottky-barrier height comprises $\text{In}_{1-x-y}\text{Ga}_x\text{Al}_y\text{As}$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$).

6. (Original) The semiconductor photo-detector as claimed in claim 4, wherein said semiconductor layer of large schottky-barrier height comprises $\text{In}_{1-x-y}\text{Ga}_x\text{Al}_y\text{As}$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$) and thin $\text{In}_{1-u}\text{Ga}_u\text{As}_{1-v}\text{P}_v$ ($0 \leq u \leq 1$, $0 \leq v \leq 1$) disposed thereon.

7. (Previously Amended) The semiconductor photo-detector as claimed in claim 4, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.

8. (Previously Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate and spaced from said edge;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
a V- or U-shaped groove opposed to said light incident facet,
wherein incident light from an optical fiber disposed in said groove is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer.

9. (Previously Amended) The semiconductor photo-detector as claimed in Claim 8, wherein said light incident facet and said V- or U-shaped groove are fabricated simultaneously by etching.

10. (Original) The semiconductor photo-detector as claimed in claim 8, wherein said light incident facet and the vicinity thereof are buried in an organic substance.

11. (Cancelled)

12. (Cancelled)

13. (Currently Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
said end surface including an abutting portion extending from said substrate a specified lateral distance beyond said edge, and surface positioned below and spaced laterally from said light incident facet and said edge for receiving an optical waveguide to contribute to precisely positioning said optical wave guide; and
~~wherein incident light from an~~ said optical waveguide precisely positioned by contacting against said abutting portion of said end surface is being refracted at said light incident facet and ~~transits transiting~~ said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer when introduced to said light incident facet.

14. (Currently Amended) A semiconductor photo-detector, comprising:
a substrate having a top surface and an end surface meeting at an edge;
a photo-absorption part comprising a semiconductor multilayer structure including a photo-absorption layer provided on said top surface of said substrate;
a light incident facet on said end surface and forming an acute angle with said top surface;
and
an upper layer ~~of over~~ said photo-absorption layer is in said photo-absorption part being terminated with a substance having a smaller refractive index than a semiconductor layer,
wherein ~~light incident~~ incident light is refracted at said light incident facet and transits said photo-absorption layer at an angle with respect to an orthogonal of said photo-absorption layer such that said transit light is totally reflected by said smaller refractive index substance ~~of terminating~~ said upper layer ~~of said photo-absorption layer.~~

15. (Cancelled)

16. (Original) The semiconductor photo-detector as claimed in claim 5, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.

17. (Original) The semiconductor photo-detector as claimed in claim 6, wherein a compositionally graded or step-graded layer from the same composition as said photo-absorption layer to the same composition as said semiconductor layer of large schottky-barrier height is disposed between said photo-absorption layer and said semiconductor layer of large schottky-barrier height.